

SEQUENCE LISTING

(1) GENERAL INFORMATION:

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(ii) TITLE OF INVENTION: G-Protein Parathyroid Hormone receptor  
HLTDG74

(iii) NUMBER OF SEQUENCES: 28

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(E) COUNTRY: USA  
(F) ZIP: 07068-1739

(v) COMPUTER READABLE FORM:

(A) MEDIUM TYPE: 3.5 INCH DISKETTE  
(B) COMPUTER: IBM PS/2  
(C) OPERATING SYSTEM: MS-DOS  
(D) SOFTWARE: WORD PERFECT 5.1

(vi) CURRENT APPLICATION DATA:

(A) APPLICATION NUMBER: 08/468,011  
(B) FILING DATE: 06-JUN-1995  
(C) CLASSIFICATION:

(viii) ATTORNEY/AGENT INFORMATION:

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(2) INFORMATION FOR SEQ ID NO:1:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 2003 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:1:

GTGGCTCTG GGCAGCCAAG TTGGCATATT GGAAGCTTTT TCCGGGCTCT GGAGGAGGGT 60

CCCTGCTTCT TCCTACAGCC GTTCCGGGC ATG GCC TGG CTG GGG GCG TCG CTC 113  
Met Ala Trp Leu Gly Ala Ser Leu

1

5

CAC GTC TGG GGT TGG CTA ATG CTC GGC AGC TGC CTC CTG GCC AGA GCC His Val Trp Gly Trp Leu Met Leu Gly Ser Cys Leu Leu Ala Arg Ala 10 15 20	161
CAG CTG GAT TCT GAT GGC ACC ATC ACT ATA GAG GAG CAG ATT GTC CTT Gln Leu Asp Ser Asp Gly Thr Ile Thr Ile Glu Glu Gln Ile Val Leu 25 30 35 40	209
GTG CTG AAA GCG AAA GTA CAA TGT GAA CTC AAC ATC ACA GCT CAA CTC Val Leu Lys Ala Lys Val Gln Cys Glu Leu Asn Ile Thr Ala Gln Leu 45 50 55	257
CAG GAG GGA GAA GGT AAT TGT TTC CCT GAA TGG GAT GGA CTC ATT TGT Gln Glu Gly Glu Gly Asn Cys Phe Pro Glu Trp Asp Gly Leu Ile Cys 60 65 70	305
TGG CCC AGA GGA ACA GTG GGG AAA ATA TCG GCT GTT CCA TGC CCT CCT Trp Pro Arg Gly Thr Val Gly Lys Ile Ser Ala Val Pro Cys Pro Pro 75 80 85	353
TAT ATT TAT GAC TTC AAC CAT AAA GGA GTT GCT TTC CGA CAC TGT AAC Tyr Ile Tyr Asp Phe Asn His Lys Gly Val Ala Phe Arg His Cys Asn 90 95 100	401
CCC AAT GGA ACA TGG GAT TTT ATG CAC AGC TTA AAT AAA ACA TGG GCC Pro Asn Gly Thr Trp Asp Phe Met His Ser Leu Asn Lys Thr Trp Ala 105 110 115 120	449
AAT TAT TCA GAC TGC CTT CGC TTT CTG CAG CCA GAT ATC AGC ATA GGA Asn Tyr Ser Asp Cys Leu Arg Phe Leu Gln Pro Asp Ile Ser Ile Gly 125 130 135	497
AAG CAA GAA TTC TGT GAA CGC CTC TAT GTA ATG TAT ACC GTT GGC TAC Lys Gln Glu Phe Cys Glu Arg Leu Tyr Val Met Tyr Thr Val Gly Tyr 140 145 150	545
TCC ATC TCT TTT GGT TCC TTG GCT GTG GCT ATT CTC ATC ATT GGT TAC Ser Ile Ser Phe Gly Ser Leu Ala Val Ala Ile Leu Ile Ile Gly Tyr 155 160 165	593
TTC AGA CGA TTG CAT TGC ACT AGG AAC TAT ATC CAC ATG CAC TTA TTT Phe Arg Arg Leu His Cys Thr Arg Asn Tyr Ile His Met His Leu Phe 170 175 180	641
GTG TCT TTC ATG CTG AGA GCT ACA AGC ATC TTT GTC AAA GAC AGA GTA Val Ser Phe Met Leu Arg Ala Thr Ser Ile Phe Val Lys Asp Arg Val 185 190 195 200	689
GTC CAT GCT CAC ATA GGA GTA AAG GAG CTG GAG TCC CTA ATA ATG CAG Val His Ala His Ile Gly Val Lys Glu Leu Glu Ser Leu Ile Met Gln 205 210 215	737
GAT GAC CCA CAA AAT TCC ATT GAG GCA ACT TCT GTG GAC AAA TCA CAA Asp Asp Pro Gln Asn Ser Ile Glu Ala Thr Ser Val Asp Lys Ser Gln 220 225 230	785
TAT ATC GGG TGC AAG ATT GCT GTT GTG ATG TTT ATT TAC TTC CTG GCT Tyr Ile Gly Cys Lys Ile Ala Val Val Met Phe Ile Tyr Phe Leu Ala 235 240 245	833

ACA AAT TAT TAT TGG ATC CTG GTG GAA GGT CTC TAC CTG CAT AAT CTC	881
Thr Asn Tyr Tyr Trp Ile Leu Val Glu Gly Leu Tyr Leu His Asn Leu	
250 255 260	
ATC TTT GTG GCT TTT TCG GAC ACC AAA TAC CTG TGG GGC TTC ATC	929
Ile Phe Val Ala Phe Phe Ser Asp Thr Lys Tyr Leu Trp Gly Phe Ile	
265 270 275 280	
TTG ATA GGC TGG GGG TTT CCA GCA GCA TTT GTT GCA GCA TGG GCT GTG	977
Leu Ile Gly Trp Gly Phe Pro Ala Ala Phe Val Ala Ala Trp Ala Val	
285 290 295	
GCA CGA GCA ACT CTG GCT GAT GCG AGG TGC TGG GAA CTT AGT GCT GGA	1025
Ala Arg Ala Thr Leu Ala Asp Ala Arg Cys Trp Glu Leu Ser Ala Gly	
300 305 310	
GAC ATC AAG TGG ATT TAT CAA GCA CCG ATC TTA GCA GCT ATT GGG CTG	1073
Asp Ile Lys Trp Ile Tyr Gln Ala Pro Ile Leu Ala Ala Ile Gly Leu	
315 320 325	
AAT TTT ATT CTG TTT CTG AAT ACG GTT AGA GTT CTA GCT ACC AAA ATC	1121
Asn Phe Ile Leu Phe Leu Asn Thr Val Arg Val Leu Ala Thr Lys Ile	
330 335 340	
TGG GAG ACC AAT GCA GTT GGG CAT GAC ACA AGG AAG CAA TAC AGG AAA	1169
Trp Glu Thr Asn Ala Val Gly His Asp Thr Arg Lys Gln Tyr Arg Lys	
345 350 355 360	
CTG GCC AAA TCG ACA CTG GTC CTG GTC CTA GTC TTT GGA GTG CAT TAC	1217
Leu Ala Lys Ser Thr Leu Val Leu Val Leu Val Phe Gly Val His Tyr	
365 370 375	
ATC GTG TTC GTG TGC CTG CCT CAC TCC TTC ACT GGG CTC GGG TGG GAG	1265
Ile Val Phe Val Cys Leu Pro His Ser Phe Thr Gly Leu Gly Trp Glu	
380 385 390	
ATC CGC ATG CAC TGT GAG CTC TTC AAC TCC TTT CAG GGT TTC TTT	1313
Ile Arg Met His Cys Glu Leu Phe Phe Asn Ser Phe Gln Gly Phe Phe	
395 400 405	
GTG TCT ATC ATC TAC TGC TAC TGC AAT GGA GAG GTT CAG GCA GAG GTG	1361
Val Ser Ile Ile Tyr Cys Tyr Cys Asn Gly Glu Val Gln Ala Glu Val	
410 415 420	
AAG AAG ATG TGG AGT CGG TGG AAT CTC TCC GTG GAC TGG AAA AGG ACA	1409
Lys Lys Met Trp Ser Arg Trp Asn Leu Ser Val Asp Trp Lys Arg Thr	
425 430 435 440	
CCG CCA TGT GGC AGC CGC AGA TGC GGC TCA GTG CTC ACC ACC GTG ACG	1457
Pro Pro Cys Gly Ser Arg Arg Cys Gly Ser Val Leu Thr Thr Val Thr	
445 450 455	
CAC AGC ACC AGC AGC CAG TCA CAG GTG GCG GCA GCA CAC GCA TGG TGC	1505
His Ser Thr Ser Ser Gln Ser Gln Val Ala Ala Ala His Ala Trp Cys	
460 465 470	
TTA TCT CTG GCA AAG CTG CCA AGA TCG CCA GCA GAC AGC CTG ACA GCC	1553
Leu Ser Leu Ala Lys Leu Pro Arg Ser Pro Ala Asp Ser Leu Thr Ala	
475 480 485	

ACA TCA CTT TAC CTG GCT ATG TCT GGA GTA ACT CAG AGC AGG ACT GCC	1601	
Thr Ser Leu Tyr Leu Ala Met Ser Gly Val Thr Gln Ser Arg Thr Ala		
490 495 500		
TCA CAC ACT CTC TCC ACG AGG AGC AAC AAG GAA GAT AGT GGG AGG CAG	1649	
Ser His Thr Leu Ser Thr Arg Ser Asn Lys Glu Asp Ser Gly Arg Gln		
505 510 515 520		
AGA GAT GAT ATT CTA ATG GAG AAG CCT TCC AGG CCT ATG GAA TCT AAC	1697	
Arg Asp Asp Ile Leu Met Glu Lys Pro Ser Arg Pro Met Glu Ser Asn		
525 530 535		
CCA GAC ACT GAA GGA TGACAAGGAG AAACTGAGGA TGTTCTCTGA ATGGACATGT	1752	
Pro Asp Thr Glu Gly		
540		
✓ GTGGCTGACT TTCATGGGCT GGTCCAATGG CTGGTTGTGT GAGAGGGCTT GGCTGATACT		1812
CCTATGCTTG AGCACAAAGG CTGAAAATTC AGTTAAGGTG TTACTTAATA ATAGTTTTA		1872
GGCTCCATGA ATTGGCTCCT GTAAATACTA ACGACATGAA AATGCAAGTG TCAATGGAGT		1932
AGTTTATTAC CTTCTATTGG CATCAAGTTT TCCTCTAAAT TAATGTATGG TATTTGCTCT		1992
GTGATTGTTC A		2003

(2) INFORMATION FOR SEQ ID NO:2:

(i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 541 amino acids  
 (B) TYPE: amino acid  
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:2:

Met Ala Trp Leu Gly Ala Ser Leu His Val Trp Gly Trp Leu Met Leu	
5 10 15	
Gly Ser Cys Leu Leu Ala Arg Ala Gln Leu Asp Ser Asp Gly Thr Ile	
20 25 30	
Thr Ile Glu Glu Gln Ile Val Leu Val Leu Lys Ala Lys Val Gln Cys	
35 40 45	
Glu Leu Asn Ile Thr Ala Gln Leu Gln Glu Gly Glu Gly Asn Cys Phe	
50 55 60	
Pro Glu Trp Asp Gly Leu Ile Cys Trp Pro Arg Gly Thr Val Gly Lys	
65 70 75 80	
Ile Ser Ala Val Pro Cys Pro Pro Tyr Ile Tyr Asp Phe Asn His Lys	
85 90 95	
Gly Val Ala Phe Arg His Cys Asn Pro Asn Gly Thr Trp Asp Phe Met	
100 105 110	
His Ser Leu Asn Lys Thr Trp Ala Asn Tyr Ser Asp Cys Leu Arg Phe	
115 120 125	

Leu Gln Pro Asp Ile Ser Ile Gly Lys Gln Glu Phe Cys Glu Arg Leu  
130 135 140

Tyr Val Met Tyr Thr Val Gly Tyr Ser Ile Ser Phe Gly Ser Leu Ala  
145 150 155 160

Val Ala Ile Leu Ile Ile Gly Tyr Phe Arg Arg Leu His Cys Thr Arg  
165 170 175

Asn Tyr Ile His Met His Leu Phe Val Ser Phe Met Leu Arg Ala Thr  
180 185 190

Ser Ile Phe Val Lys Asp Arg Val Val His Ala His Ile Gly Val Lys  
195 200 205

Glu Leu Glu Ser Leu Ile Met Gln Asp Asp Pro Gln Asn Ser Ile Glu  
210 215 220

Ala Thr Ser Val Asp Lys Ser Gln Tyr Ile Gly Cys Lys Ile Ala Val  
225 230 235 240

Val Met Phe Ile Tyr Phe Leu Ala Thr Asn Tyr Tyr Trp Ile Leu Val  
245 250 255

Glu Gly Leu Tyr Leu His Asn Leu Ile Phe Val Ala Phe Phe Ser Asp  
260 265 270

Thr Lys Tyr Leu Trp Gly Phe Ile Leu Ile Gly Trp Gly Phe Pro Ala  
275 280 285

Ala Phe Val Ala Ala Trp Ala Val Ala Arg Ala Thr Leu Ala Asp Ala  
290 295 300

Arg Cys Trp Glu Leu Ser Ala Gly Asp Ile Lys Trp Ile Tyr Gln Ala  
305 310 315 320

Pro Ile Leu Ala Ala Ile Gly Leu Asn Phe Ile Leu Phe Leu Asn Thr  
325 330 335

Val Arg Val Leu Ala Thr Lys Ile Trp Glu Thr Asn Ala Val Gly His  
340 345 350

Asp Thr Arg Lys Gln Tyr Arg Lys Leu Ala Lys Ser Thr Leu Val Leu  
355 360 365

Val Leu Val Phe Gly Val His Tyr Ile Val Phe Val Cys Leu Pro His  
370 375 380

Ser Phe Thr Gly Leu Gly Trp Glu Ile Arg Met His Cys Glu Leu Phe  
385 390 395 400

Phe Asn Ser Phe Gln Gly Phe Phe Val Ser Ile Ile Tyr Cys Tyr Cys  
405 410 415

Asn Gly Glu Val Gln Ala Glu Val Lys Lys Met Trp Ser Arg Trp Asn  
420 425 430

Leu Ser Val Asp Trp Lys Arg Thr Pro Pro Cys Gly Ser Arg Arg Cys  
435 440 445

Gly Ser Val Leu Thr Thr Val Thr His Ser Thr Ser Ser Gln Ser Gln  
450 455 460

Val Ala Ala Ala His Ala Trp Cys Leu Ser Leu Ala Lys Leu Pro Arg  
465 470 475 480

Ser Pro Ala Asp Ser Leu Thr Ala Thr Ser Leu Tyr Leu Ala Met Ser  
485 490 495

Gly Val Thr Gln Ser Arg Thr Ala Ser His Thr Leu Ser Thr Arg Ser  
500 505 510

Asn Lys Glu Asp Ser Gly Arg Gln Arg Asp Asp Ile Leu Met Glu Lys  
515 520 525

Pro Ser Arg Pro Met Glu Ser Asn Pro Asp Thr Glu Gly  
530 535 540

(2) INFORMATION FOR SEQ ID NO:3:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 23 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: not relevant
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:3:

CAGCCGTCCC GGGCTTGGCC TGG

23

(2) INFORMATION FOR SEQ ID NO:4:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 27 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: not relevant
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:4:

CCTCAGTGTC GACTTGTCACT CCTTCAG

27

(2) INFORMATION FOR SEQ ID NO:5:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 27 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: not relevant
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:5:

GTTGGCATAT TGGAAGCTTT TTGCGGG

27

(2) INFORMATION FOR SEQ ID NO:6:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 28 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:6:

CAGTTTCTAG ATGTCATCCT TCAGTGTC

28

(2) INFORMATION FOR SEQ ID NO:7:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 39 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: not relevant
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:7:

TCCTACCCGG GCCGCCATCA TGGCCTGGCT GGGGGGCCT

39

(2) INFORMATION FOR SEQ ID NO:8:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 28 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: not relevant
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:8:

CAGTTTCTAG ATGTCATCCT TCAGTGTC

28

(2) INFORMATION FOR SEQ ID NO:9:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 60 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:9:

Ile Met Gln Asp Asp Pro Gln Asn Ser Ile Glu Ala Thr Ser Val  
5 10 15  
Asp Lys Ser Gln Tyr Ile Gly Cys Lys Ile Ala Val Val Met Phe  
20 25 30  
Ile Tyr Phe Leu Ala Thr Asn Tyr Tyr Trp Ile Leu Val Glu Gly  
35 40 45

Leu Tyr Leu His Asn Leu Ile Phe Val Ala Phe Phe Ser Asp Thr  
50 55 60

(2) INFORMATION FOR SEQ ID NO:10:

(i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 60 amino acids  
(B) TYPE: amino acid  
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:10:

Ile Thr Glu Glu Glu Leu Arg Ala Phe Thr Glu Pro Pro Pro Ala  
5 10 15  
Asp Lys Ala Gly Phe Val Gly Cys Arg Val Ala Val Thr Val Phe  
20 25 30  
Leu Tyr Phe Leu Thr Thr Asn Tyr Tyr Trp Ile Leu Val Glu Gly  
35 40 45  
Leu Tyr Leu His Ser Leu Ile Phe Met Ala Phe Phe Ser Glu Lys  
50 55 60

(2) INFORMATION FOR SEQ ID NO:11:

(i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 60 amino acids  
(B) TYPE: amino acid  
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:11:

Lys Tyr Leu Trp Gly Phe Ile Leu Ile Gly Trp Gly Phe Pro Ala  
5 10 15  
Ala Phe Val Ala Ala Trp Ala Val Ala Arg Ala Thr Leu Ala Asp  
20 25 30  
Ala Arg Cys Trp Glu Leu Ser Ala Gly Asp Ile Lys Trp Ile Tyr  
35 40 45  
Gln Ala Pro Ile Leu Ala Ala Ile Gly Leu Asn Phe Ile Leu Phe  
50 55 60

(2) INFORMATION FOR SEQ ID NO:12:

(i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 60 amino acids  
(B) TYPE: amino acid  
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:12:

Lys Trp Leu Trp Gly Phe Thr Leu Phe Gly Trp Gly Leu Pro Ala  
5 10 15  
Val Phe Val Ala Val Trp Val Thr Val Arg Ala Thr Leu Ala Asn

20 25 30  
Thr Glu Cys Trp Asp Leu Ser Ser Gly Asn Lys Lys Trp Ile Ile  
35 40 45  
Gln Val Pro Ile Leu Ala Ala Ile Val Val Asn Phe Ile Leu Phe  
50 55 60

(2) INFORMATION FOR SEQ ID NO:13:

(i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 50 amino acids  
(B) TYPE: amino acid  
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:13:

Leu Asn Thr Val Arg Val Leu Ala Thr Lys Ile Trp Glu Thr Asn  
5 10 15  
Ala Val Gly His Asp Thr Arg Lys Gln Tyr Arg Lys Leu Ala Lys  
20 25 30  
Ser Thr Leu Val Leu Val Leu Phe Gly Val His Ile Val Phe Val  
35 40 45  
Cys Leu Pro His Ser  
50

(2) INFORMATION FOR SEQ ID NO:14:

(i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 52 amino acids  
(B) TYPE: amino acid  
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:14:

Ile Asn Ile Ile Arg Val Leu Ala Thr Lys Leu Arg Glu Thr Asn  
5 10 15  
Ala Gly Arg Cys Asp Thr Arg Gln Gln Tyr Arg Lys Leu Leu Lys  
20 25 30  
Ser Thr Leu Val Leu Met Pro Leu Phe Gly Val His Tyr Ile Val  
35 40 45  
Phe Met Ala Thr Pro Tyr Thr  
50

(2) INFORMATION FOR SEQ ID NO:15:

(i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 60 amino acids  
(B) TYPE: amino acid  
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:15:

Glu	Gly	Asn	Cys	Phe	Pro	Glu	Trp	Asp	Gly	Leu	Ile	Cys	Trp	Pro
				5					10					15
Arg	Gly	Thr	Val	Gly	Lys	Ile	Ser	Ala	Val	Pro	Cys	Pro	Pro	Tyr
				20					25					30
Ile	Tyr	Asp	Phe	Asn	His	Lys	Gly	Val	Ala	Phe	Arg	His	Cys	Asn
				35					40					45
Pro	Asn	Gly	Thr	Trp	Asp	Phe	Met	His	Ser	Leu	Asn	Lys	Thr	Trp
				50					55					60

(2) INFORMATION FOR SEQ ID NO:16:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 60 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:16:

Asp	Gly	Phe	Cys	Leu	Pro	Glu	Trp	Asp	Asn	Ile	Val	Cys	Trp	Pro
				5					10					15
Ala	Gly	Val	Pro	Gly	Lys	Val	Val	Ala	Val	Pro	Cys	Pro	Asp	Tyr
				20					25					30
Ile	Tyr	Asp	Phe	Asn	His	Lys	Gly	Arg	Ala	Tyr	Arg	Arg	Cys	Asp
				35					40					45
Ser	Asn	Gly	Ser	Trp	Glu	Leu	Val	Pro	Gly	Asn	Asn	Arg	Thr	Trp
				50					55					60

(2) INFORMATION FOR SEQ ID NO:17:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 10 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:17:

Ala	Asn	Tyr	Ser	Asp	Cys	Leu	Arg	Phe	Leu
					5				10

(2) INFORMATION FOR SEQ ID NO:18:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 10 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:18:

Ala	Asn	Tyr	Ser	Glu	Cys	Val	Lys	Phe	Leu
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## (2) INFORMATION FOR SEQ ID NO:19:

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 60 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:19:

Lys	Gln	Glu	Phe	Cys	Glu	Arg	Leu	Tyr	Val	Met	Tyr	Thr	Val	Gly
					5				10					15
Tyr	Ser	Ile	Ser	Phe	Gly	Ser	Leu	Ala	Val	Ala	Ile	Leu	Ile	Ile
					20				25					30
Gly	Tyr	Phe	Arg	Arg	Leu	His	Cys	Thr	Arg	Asn	Tyr	Ile	His	Met
					35				40					45
His	Leu	Phe	Val	Ser	Phe	Met	Leu	Arg	Ala	Thr	Ser	Ile	Phe	Val
					50				55					60

## (2) INFORMATION FOR SEQ ID NO:20:

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 60 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:20:

Glu	Arg	Glu	Val	Phe	Asp	Arg	Leu	Gly	Met	Ile	Tyr	Thr	Val	Gly
					5				10					15
Tyr	Ser	Ile	Ser	Leu	Gly	Ser	Leu	Thr	Val	Ala	Val	Leu	Ile	Leu
					20				25					30
Gly	Tyr	Phe	Arg	Arg	Leu	His	Cys	Thr	Arg	Asn	Tyr	Ile	His	Met
					35				40					45
His	Leu	Phe	Val	Ser	Phe	Met	Leu	Arg	Ala	Val	Ser	Ile	Phe	Ile
					50				55					60

## (2) INFORMATION FOR SEQ ID NO:21:

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 21 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:21:

Lys	Asp	Arg	Val	Val	His	Ala	His	Ile	Gly	Val	Lys	Glu	Leu	Glu
					5				10					15
Ser	Leu	Ile	Met	Gln	Asp									
					20									

(2) INFORMATION FOR SEQ ID NO:22:

(i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 21 amino acids  
(B) TYPE: amino acid  
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:22:

Lys Asp Ala Val Leu Tyr Ser Gly Val Ser Thr Asp Glu Ile Glu  
5 10 15  
Arg Ile Thr Glu Glu  
20

(2) INFORMATION FOR SEQ ID NO:23:

(i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 59 amino acids  
(B) TYPE: amino acid  
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:23:

Thr Gly Leu Gly Trp Glu Ile Arg Met His Cys Glu Leu Phe Phe  
5 10 15  
Asn Ser Phe Gln Gly Phe Phe Val Ser Ile Ile Tyr Cys Tyr Cys  
20 25 30  
Asn Gly Glu Val Gln Ala Glu Val Lys Lys Met Trp Ser Arg Trp  
35 40 45  
Asn Leu Ser Val Asp Trp Lys Arg Thr Pro Pro Cys Gly Ser  
50 55

(2) INFORMATION FOR SEQ ID NO:24:

(i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 59 amino acids  
(B) TYPE: amino acid  
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:24:

Ser Gly Ile Leu Trp Gln Val Gln Met His Tyr Glu Met Leu Phe  
5 10 15  
Asn Ser Phe Gln Gly Phe Phe Val Ala Ile Ile Tyr Cys Phe Cys  
20 25 30  
Asn Gly Glu Val Gln Ala Glu Ile Lys Lys Ser Trp Ser Arg Trp  
35 40 45  
Thr Leu Ala Leu Asp Phe Lys Arg Lys Ala Arg Ser Gly Ser  
50 55

(2) INFORMATION FOR SEQ ID NO:25:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 37 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:25:

Ala Gln Leu Asp Ser Asp Gly Thr Ile Thr Ile Glu Glu Gln Ile  
5 10 15  
Val Leu Val Leu Lys Ala Lys Val Gln Cys Glu Leu Asn Ile Thr  
20 25 30  
Ala Gln Leu Gln Glu Gly Glu  
35

(2) INFORMATION FOR SEQ ID NO:26:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 37 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:26:

Ala Leu Val Asp Ala Asp Asp Val Ile Thr Lys Glu Glu Gln Ile  
5 10 15  
Ile Leu Leu Arg Asn Ala Gln Ala Gln Cys Glu Gln Arg Leu Lys  
20 25 30  
Glu Val Leu Arg Val Pro Glu  
35

(2) INFORMATION FOR SEQ ID NO:27:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 23 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:27:

Ile Ser Gly Lys Ala Ala Lys Ile Ala Ser Arg Gln Pro Asp Ser  
5 10 15  
His Ile Thr Leu Pro Gly Tyr Val  
20

(2) INFORMATION FOR SEQ ID NO:28:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 23 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:28:

Leu Ser Pro Arg Leu Ala Pro Gly Ala Gly Ala Ser Ala Asn Gly  
5 10 15  
His His Gln Leu Pro Gly Tyr Val  
20

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CC

57